In The Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of bonding and debonding two or more surfaces or supports or layers of an adhesive system, the method comprising:

(i) providing a first power level of thermal radiation and/[[ ]]or thermal conduction and/or thermal energy which passes through ~~the~~ an adhesive composition comprising:

(a) an adhesive agent,

(b) a cleaner,

(c) a primer,

(d) a first set of thermoexpandable microspheres associated with curing and bonding, and

(e) a second set of thermoexpandable microspheres associated with debonding,

wherein said second set of thermoexpandable microspheres comprises microspheres encapsulating an expanding agent, said microspheres encapsulating an expanding agent comprising about 3-5%, by weight, of the cleaner and about 5-10%, by weight, of the primer,

such that ~~so~~ the contents of the ~~a~~ first set of thermoexpandable microspheres leach or migrate through the~~ir~~ porous shells of the first set of thermoexpandable microspheres into the matrix of the adhesive composition, thereby curing the adhesive composition ~~and wherein the first set of thermoexpandable microspheres is associated with curing and bonding~~; and

(ii) providing a second power level of thermal radiation and/or thermal conduction and/or thermal energy which concentrates on the ~~adhesive~~ surfaces or supports or layers of the adhesive system so as to expand the ~~a~~ second set of thermoexpandable microspheres ~~in the~~

~~adhesive and/or cleaner and/or primer layers~~, thereby weakening the adhesive forces in the interface of the adhesive system.

2. (Currently Amended) The method according to claim 1, wherein the first ~~second~~ power level of thermal radiation and/[[ ]]or thermal conduction and/or thermal energy which passes through the adhesive composition causes the contents of the first ~~second~~ set of thermoexpandable microspheres to leach or migrate through the~~ir~~ porous shells of the first set of thermoexandable microspheres into the matrix of the adhesive composition.

3. (Currently Amended) The method according to claim 1, wherein the first ~~second~~ set of thermoexpandable microspheres comprises a blowing agent, which acts as a carrier for the contents of the first ~~second~~ set of thermoexpandable microspheres.

4. (Currently Amended) An adhesive composition comprising an adhesive agent and dispersed therein a first set of thermoexpandable microspheres being associated with curing and bonding and a second set of thermoexpandable microspheres being associated with debonding, wherein the first and second sets of thermoexpandable microspheres are dispersed therein in an arrangement of micro-wires, electrically conductive fibres or aluminum/steel filaments and are not simultaneously activatable.

5. (Previously Presented) The method according to claim 1, wherein step (i) is performed after adhesive composition deposition and step (ii) is performed days, weeks, months or years apart.

6. (Previously Presented) The method according to claim 1, wherein the second set of thermoexpandable microspheres comprise a co-polymeric shell which encapsulates an expanding agent and the first set of thermoexpandable microspheres comprise a co-polymeric shell which encapsulates a curing agent or catalyst mixed with an expanding agent.

7. (Previously Presented) The method according to claim 6, wherein the expanding agents are selected from the group comprising an expandable gas, a volatile agent, a sublimation agent, water, an agent which attracts water or an explosive agent.

8. (Previously Presented) The method according to claim 1, wherein the microspheres associated with curing and bonding have a larger cross sectional diameter than those associated with debonding.

9. (Currently Amended) The method according to claim 1, further comprising a curing activator.

10. (Previously Presented) The method according to claim 9, wherein the curing activator is activated by an applied thermal energy or by its own energy.

11. (Currently Amended) The method according to claim 1, wherein the adhesive agent is polyurethane or polyvinylchloride or an MS polymer or an epoxy resin.

12. (Previously Presented) The method according to claim 1, wherein the microspheres associated with debonding are activated in a temperature range of about 45 to 220 °C.

13. (Previously Presented) The method according to claim 1, wherein the microspheres associated with curing and bonding are activated at a different temperature from those used in the debonding phase, the temperature difference being between 20 to 100 °C.

14. (Canceled)

15. (Currently Amended) The method according to claim 1, wherein the first set of thermoexpandable microspheres comprises microspheres encapsulating a curing agent or catalyst, said microspheres encapsulating the curing agent or catalyst constituting about 2-3%, by weight, of the adhesive composition.

16. (Currently Amended) The method according to claim 1, wherein the thermal radiation and/ or thermal conduction and/or thermal energy provided to the first and second sets of thermoexpandable microspheres is provided by a means comprising a source of IR or UV electromagnetic radiation, or from a convection oven or from electrical means, a battery or a laser or from an ultrasonic source or from gas or from white light or microwaves or sonic waves.

17. (Previously Presented) The method according to claim 16, wherein in the instance of using IR radiation it is provided as a wavelength of about 800-1400 nm to 2000-6000 nm and concentrates heating radiation on the first and second sets of thermoexpandable microspheres in order to reach their activation expanding temperature in advance of the adhesive matrix degradation temperature.

18. (Previously Presented) The method according to claim 1, wherein the first and second sets of thermoexpandable microspheres are provided embedded in or coated on to a tape, mesh or film, or attached to a wire, filament or fiber.

19. (Previously Presented) The method according to claim 1, wherein the first and second sets of thermoexpandable microspheres are coated in a black material.

20. (Currently Amended) The method according to claim 1, wherein either, or both, of the first and second sets of thermoexpandable microspheres are coated with or encapsulate one or more ~~a~~ monomers and/or ~~with~~ nanoparticles ~~dispersed in the porous initial~~

~~microsphere shell~~.

21. (Currently Amended) The method according to claim 1, wherein either, or both, of the first and second sets of thermoexpandable microspheres acts as a vehicle, transporter, carrier, chemical or physical ~~or~~ barrier or dispersing aid~~, aid~~ to prevent the clustering of one or more molecules, ~~particles or~~ nanoparticles, ~~or~~ detergents or cleaning agent[[u]]s in a mixture comprising a binder and solvent, the thermoexpandable microspheres either encapsulating a desired agent or being coated therewith.

22. (Currently Amended) The adhesive composition according to claim 4 ~~method according to claim 1~~, wherein the first and second sets of thermoexpandable microspheres are dispersed in an arrangement of micro-wires so as to form a polygonal arrangement.

23. (Currently Amended) The adhesive composition ~~method~~ according to claim 22, wherein the micro-wires are about 100-200μ in length.

24. (Currently Amended) The adhesive composition ~~method~~ according to claim 23, wherein the micro-wires are about 2-20μ in diameter.

25. (Currently Amended) The adhesive composition ~~method~~ according to claim 22, wherein the composition comprises about 1-10% volume of micro-wires.

26. (Previously Presented) The method according to claim 1, wherein the first and second sets of thermoexpandable microspheres are attached to a contact surface of one or more of the components which it is desired to attach and/or separate or on an internal surface of the components or at an interface of the cleaner and/or primer of said components.

27. (Currently Amended) The method according to claim 1, wherein the adhesive

composition comprising the first and second sets of thermoexpandable microspheres is provided in a continuous or discontinuous predefined path substantially around the periphery of one or more of the surfaces or supports or layers of the adhesive system, said predefined path being in the form of a channel, a groove, a line or concentric circles ~~or in spots in path or channel or groove or line or concentric circles provided substantially around the periphery of one or both of the contact surfaces of the items which it is desired to attach or detach~~.

28. (Currently Amended) The method according to claim 1, wherein the depth and breadth or thickness and wideness of the adhesive composition may be uniform or may vary as required in areas of the surface(s) or support(s) or layer(s) which need to be attached or detached.

29. (Currently Amended) A method of attaching or bonding two or more surfaces or supports or layers together comprising:

(i) applying an adhesive composition according to claim 4 to one or more of the ~~contact~~ surfaces or supports or layers which are ~~of each or all items which is~~ to be bonded together; and

(ii) supplying sufficient thermal radiation and/[[ ]]or thermal conduction and/or thermal energy to the adhesive composition via contact with one or more of the ~~contact~~ surfaces or supports or layers ~~of each or all items which is to be bonded together~~ so as to cause a proportion of the first set of thermoexpandable microspheres to expand and optionally to further release a curing agent into the composition during the bonding process.

30-31. (Canceled)

32. (Withdrawn) An apparatus for attaching or detaching two or more surfaces that have been bonded together comprising an IR emitting device comprising at least one bulb, at least one lens and at least one reflecting mirror mutually arranged so that heat is

directed or focused only at an adhesive interface or a path where the thermoexpandable microspheres are present.

33. (Withdrawn) An apparatus according to claim 32 capable of emitting IR radiation in the range of about 800-1400 nm to 2000-6000 nm.

34. (Withdrawn) An apparatus according to claim 31 that is automated and operably linked to a computer program providing information to device sensors of an adhesive bonding path.

35. (Withdrawn) An apparatus according to claim 32 mounted on a mobile unit so that it is free to follow a predefined adhesive bonding path.

36. (Withdrawn) An apparatus according to claim 35 capable of concentrating an IR beam at certain partial points of the surface which it is desired to bond or de-bond in different steps at command.

37. (Withdrawn) An apparatus according to claim 36 that is pre-programmed to follow a specific bonding path in direction, width and breadth.

38. (Currently Amended) A method of bonding an adhesive composition, the adhesive composition being present at an interface and being placed between two or more surfaces of vehicle glazing or vehicle panel(s) or part(s), the adhesive composition comprising an adhesive agent and/or cleaner and/or primer and thermoexpandable microspheres dispersed therein in an arrangement of micro-wires, electrically conductive fibres or aluminum/steel filaments, the microspheres having a diameter of between 30-50 μm and an activation temperature range of between 50-100 °C and encapsulating at least one curing agent and/or catalyst and/or activator, said bonding being effected by exposing the microspheres to a power level of thermal radiation and/or thermal energy that results in a temperature received by the microspheres in the range of 50-100 °C.

39. (Canceled)

40. (Currently Amended) A method of curing an adhesive and de-bonding the same adhesive from automotive glazing, panels or parts comprising:

(i) applying an adhesive composition between two or more surfaces of the glazing, panel(s) or part(s), said adhesive composition comprising an adhesive and thermoexpandable microspheres dispersed therein in an arrangement of micro-wires, electrically conductive fibres or aluminum/steel filaments, said thermoexpandable microspheres comprising a first set of thermoexpandable microspheres having a diameter of between 30-50 μm and an activation temperature range of between 50-100 C° and a second set of thermoexpandable microspheres having a diameter of between 10-50 μm and an activation temperature range of between 110-210 C°,

(ii) activating curing of the composition by exposing it to a first power level of thermal radiation and/or thermal energy that results in a temperature received by the thermoexpandable microspheres in the range of 50-100 C°; and

(iii) de[[-]]bonding the adhesive system at its interfaces by exposing it to a second power level of thermal radiation and/or thermal energy that results in a temperature received by the thermoexpandable microspheres in the range of 110-210 C°.

41. (Canceled)

42. (Previously Presented) A method according to claim 40 for the removal of vehicle glazing, panels or parts in an end of vehicle life process.

43. (Currently Amended) A method of detaching or debonding two or more surfaces that have been bonded together comprising, supplying sufficient thermal radiation and/[[ ]]or thermal conduction and/or thermal energy to a surface having coated thereon or attached thereto the adhesive composition of claim 4, the thermal energy being supplied to one or more of the contact surfaces of each item which are to be detached/separated so as to cause the second set of thermoexpandable microspheres to increase in volume and to become a pressure activator so as to debond the interfaces of the adhesion system.

44. (Canceled)

45. (Currently Amended) The adhesive composition ~~method~~ according to claim [[4]]4, wherein the microwires, electrically conductive fibres or aluminum/steel filaments are dispersed so as to create a tangle of electrical conductors.

46. (New) The method according to claim 1, wherein the adhesive composition is sandwiched between the surfaces or supports or layers of the adhesive system.

47. (New) The method according to claim 1, wherein the adhesive composition further comprises a third set of thermoexpandable microspheres.

48. (New) The adhesive composition according to claim 4, wherein the first and second sets of microspheres comprise about 5-10%, by weight of the adhesive composition.

49. (New) The adhesive composition according to claim 4, further comprising a third set of thermoexpandable microspheres.

50. (New) The adhesive composition according to claim 4, wherein either, or both, of the first and second sets of thermoexpandable microspheres are coated with or encapsulate one or more monomers and/or nanoparticles and/or detergents and/or gold.

51. (New) The adhesive composition according to claim 4, wherein said adhesive composition is embedded in or coated on a tape or mesh or film.

52. (New) The method according to claim 29, wherein the adhesive composition is sandwiched between the surfaces or supports or layers which are to be bonded together.

53. (New) The method according to claim 43, wherein said method is performed days, weeks, months or years after deposition and curing of the adhesive composition.

54. (New) The adhesive composition according to claim 4, wherein the first and second sets of microspheres are activated at different temperatures, the temperature difference being between 20 to 100 °C.